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A NEW SUBGENUS OF *CULEX* IN THE NEOTROPICAL REGION (DIPTERA: CULICIDAE)¹

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ABSTRACT. *Phenacomyia*, a new subgenus in the Neotropical Region, is separated and distinguished from the subgenus *Culex*. Additions to published keys are included for its identification among the subgenera of *Culex* in the New World.

INTRODUCTION

The new subgenus described below was a serendipitous discovery made during an ongoing project involving the identification of mosquitoes collected in Belize. As Louis Pasteur once said: "In the fields of observation, chance favors the prepared mind" (translation in Roberts 1989). In this case, while attempting to confirm the identification and association of adult specimens and larval exuviae, we noticed that the larva of *Culex* (*Culex*) *lactator* Dyar and Knab has an unusual maxillary brush. Under the circumstances, we probably would have overlooked the significance of this unexpected observation if we had not just finished a study of maxillary structure and its importance in the classification of the tribe Sabethini. Having learned that overt differences in maxillary structure are generally supraspecific in nature, we wondered if *Cx. lactator* belonged to another subgenus. While trying to answer this question, we discovered a number of unique characters which distinguish the larva of this species, and its closely related sister species, *Cx. corniger* Theobald, from all other subgenera of *Culex*. Based on these striking features, as well as correlated though less striking differ-

ences in the adults and pupae, it was obvious that these two species belong to a phyletic line distinct from the subgenus *Culex* Linnaeus. We subsequently recognized *Cx. airozai* Lane as a member of this group based on adult characters. In this paper we provide a name for this previously unrecognized subgeneric group, and make a comparison of diagnostic characters with the subgenus *Culex*.

Phenacomyia, new subgenus

Type species. *Culex corniger* Theobald, 1903. Included species: *Culex lactator* Dyar and Knab, 1906; *Culex airozai* Lane, 1945.

The subgenus *Phenacomyia* is characterized by several unique diagnostic and differential characters. These characters are listed and contrasted with homologous characters of the subgenus *Culex* in Table 1. The numbered characters in Table 1 correspond to the numbered arrows in Figs. 1-6. No obvious distinctions were noted in the cibarial armature or genitalia of females.

Diagnosis. Five shared derived characters clearly indicate the monophyly of this subgeneric group (numbers 4, 5, 11, 16 and 17 in the table and figures): setae *d-1* of gonocoxite of male represented by one small hairlike seta, dorsal arm of phallosome of male very short, setae 4-7-C of larva inserted in more or less straight transverse line, siphon of larva with a prominent dorsal seta at midlength, and maxilla of larva with reduced maxillary brush and other unique features.

¹ The views of the authors do not purport to reflect the views of the Department of the Army or the Department of Defense.

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Etymology. *Phenacomyia* is derived from the Greek nouns *phenax* (m. deceiver, cheat, impostor; combining form *phenaco-*) and *myia* (f. fly) in reference to the included species having been mistaken for members of the subgenus *Culex*. The name is feminine in gender. The three-letter abbreviation *Phc.* is recommended for this subgenus.

Discussion. At present, 23 subgenera are recognized within the genus *Culex*: the Old World subgenera *Acalleoemyia* Leicester, *Acalyntrum* Stone and Penn., *Afrocullex* Danilov, *Barraudius* Edwards, *Culiciomyia* Theobald, *Eumelanomyia* Theobald, *Kitzmilleria* Danilov, *Lasiosiphon* Kirkpatrick, *Lophoceraomyia* Theobald, and *Maillotia* Theobald; the New World subgenera *Aedinus* Lutz, *Allimanta* Casal and Garcia, *Anoedioporpia* Dyar, *Belkinomyia* Adames and Galindo, *Carrollia* Lutz, *Melanoconion* Theobald, *Micraedes* Coquillett, *Microcullex* Theobald, *Phenacomyia* Harbach and Peyton, and *Tinolestes* Coquillett; and the widespread subgenera *Lutzia* Theobald, *Neocullex* Dyar, and *Culex*. Several of these subgenera, including *Culex*, appear to represent two or more distinct lines of descent.

The subgenus *Culex* is a large and diverse group with more than 200 species which are distributed throughout the world. Two main lines, the Pipiens and Sitiens groups (Edwards 1932), and two secondary or annectent lines, the Atriceps and Duttoni groups (Belkin 1962 and Harbach 1988, respectively), are currently recognized within the subgenus. As far as known, all New World species of the subgenus belong to the Pipiens Group; and whereas Old World species of this group are classified into a number of subgroups (Mattingly and Rageau 1958, Sirivanakarn 1976, Harbach 1988), no infrasubgeneric groups are currently recognized for New World species [Lane (1953) divided New World species into Groups A and B based on the absence or presence, respectively, of a foliform seta (g) on the gonocoxite of males, but these groups were not recognized by Bram (1967a) who last revised the subgenus in the New World]. This is an indication of how little taxonomic

work has been done on this subgenus in the New World, and the results of the present study clearly demonstrate the need for a thorough revision, with particular emphasis on characters of the larval stage.

The affinities of *Phenacomyia* are unknown. It appears to be more closely allied to the subgenus *Culex* than to other subgenera within the genus, and for this reason these two subgenera are contrasted in Table 1. It closely resembles the Duttoni Group in the general ornamentation of adults (Harbach 1988), and the Pipiens Group in the overall construction of the male genitalia (Belkin 1962, Sirivanakarn 1976, Harbach 1988). Larvae share the positional relationship of setae 8,9-C, an antenna of nearly uniform diameter, and a weakly developed seta 1-A with *Carrollia* (Valencia 1973); a well developed seta 7-II with *Micraedes* (Berlin 1969), *Cx. (Cux.) duttoni* Theobald (Harbach 1988), and two species of *Culiciomyia* in the Oriental Region (Bram 1967b); and bear an uncanny resemblance to *Cx. (Cul.) cinereus* Theobald of the Ethiopian Region in the development of the antenna and siphon (Hopkins 1952). These similarities are probably due to homoplasy since *Phenacomyia* (New World) and *Culiciomyia* (Old World) are otherwise strikingly different in all life stages.

The taxonomy of *Cx. corniger* and *Cx. lactator* was recently reviewed by Strickman and Pratt (1989) who elevated *Cx. lactator* from synonymy with *Cx. corniger*. These species are closely related and very similar in all life stages. Strickman and Pratt (1989) should be consulted for detailed information on the separation and biology of these species. Lane (1945, 1953) should be consulted for information regarding *Cx. airozai*.

Phenacomyia is a distinct element of the genus *Culex*. It can be distinguished from the other subgenera of *Culex* in the New World by adding the following modifications to the keys developed by Berlin and Belkin (1980). The terms used by Berlin and Belkin for certain anatomical features have been changed to conform with the terminology of Harbach and Knight (1980).

Table 1. Comparison of diagnostic and differential characters in the subgenera *Phenacomyia* (New World) and *Culex* (worldwide).

Stage	Character	<i>Phenacomyia</i>	<i>Culex</i>
Adults	(1) scutum	with conspicuous pale-scaled areas (Fig. 1A,C) (see key couplet 4a)	normally unicolorous, some species with varied pale-scaled areas (Fig. 1B,D) (see key couplet 4a)
	(2) upper mesepimeral scales	absent (Fig. 1C)	present on majority of species (Fig. 1D)
	(3) lower mesepimeral setae	1-5 (mode 3) (Fig. 1C)	normally 1,2 (mode 1) (Pipiens Group) (Fig. 1D), 1-3 (Atriceps Group), 1-4 (Duttoni Group), absent (Sitiens Group)
	(4) δ -setae <i>d-f</i> of subapical lobe	one small hairlike seta (<i>f</i>) (Fig. 2)	normally 3,4 setae, all absent in a few species, <i>f</i> usually relatively large (Fig. 3)
	(5) δ -dorsal arm of lateral plate	very short (Fig. 2)	large (Pipiens Group) (Fig. 3) or absent (Atriceps, Duttoni and Sitiens groups)
	(6) δ -tergum IX lobe	with 12-29 setae in 3-5 rows, usually more than 17 setae (Fig. 2)	with 2-17 setae in 1-3 rows, usually 10 or fewer setae (Fig. 3)
Pupae	(7) trumpet	short and strongly flared, pinna length less than diameter at apex (Fig. 2)	variable, usually elongate with pinna equal to or longer than diameter at apex, normally longer (Fig. 3)
	(8) seta 6-I,II	hardly if at all longer than 7-I,II (Fig. 2)	usually distinctly longer than 7-I,II (Fig. 3)
Larvae	(9) antenna	short, about 0.35 length of head, distal part scarcely if at all narrower than proximal part (Fig. 4)	long, about 0.75 length of head, distal part narrower than proximal part (Fig. 5)
	(10) seta 1-A	weakly developed, with few short branches inserted at mid-length of antenna (Fig. 4)	strongly developed, with numerous long branches, normally inserted well beyond midlength of antenna (Fig. 5)
	(11) setae 4-7-C	inserted in more or less straight line (Fig. 4)	4,5,6-C inserted in triangular pattern distinctly posterior to 7-C (Fig. 5)
	(12) seta 8-C	inserted anterior to 9-C, usually single, longer than 10-C (Fig. 4)	normally inserted posterior to 9-C, branched and shorter than 10-C (Fig. 5)
	(13) setae 14-C	inserted slightly posterior to 13-C (Fig. 4)	inserted on line with or slightly anterior to 13-C (Fig. 5)
	(14) seta 3-P	with 3,4 branches, shorter than 1,2-P (Fig. 4)	single, rarely double, about as long as 1,2-P (Fig. 5)
	(15) seta 7-II	as large as 7-I (Fig. 4)	much smaller than 7-I (Fig. 5)
	(16) siphon	with a prominent dorsal seta at midlength (Fig. 4)	without dorsal seta at mid-length (Fig. 5) (dorsolateral and lateral setae sometimes present)
	(17) maxilla	rectangular, maxillary brush reduced, brush and pilose area on dorsal surface removed laterad of maxillary suture, setae 4,5-Mx relatively far apart, seta 1-Mx inserted about 0.67 from base of maxilla (Fig. 6A,B)	ovoid, maxillary brush with long spicules, brush and pilose area borne immediately adjacent to maxillary suture, setae 4,5-Mx closer together, seta 1-Mx inserted about 0.5 from base of maxilla (Fig. 6C,D)

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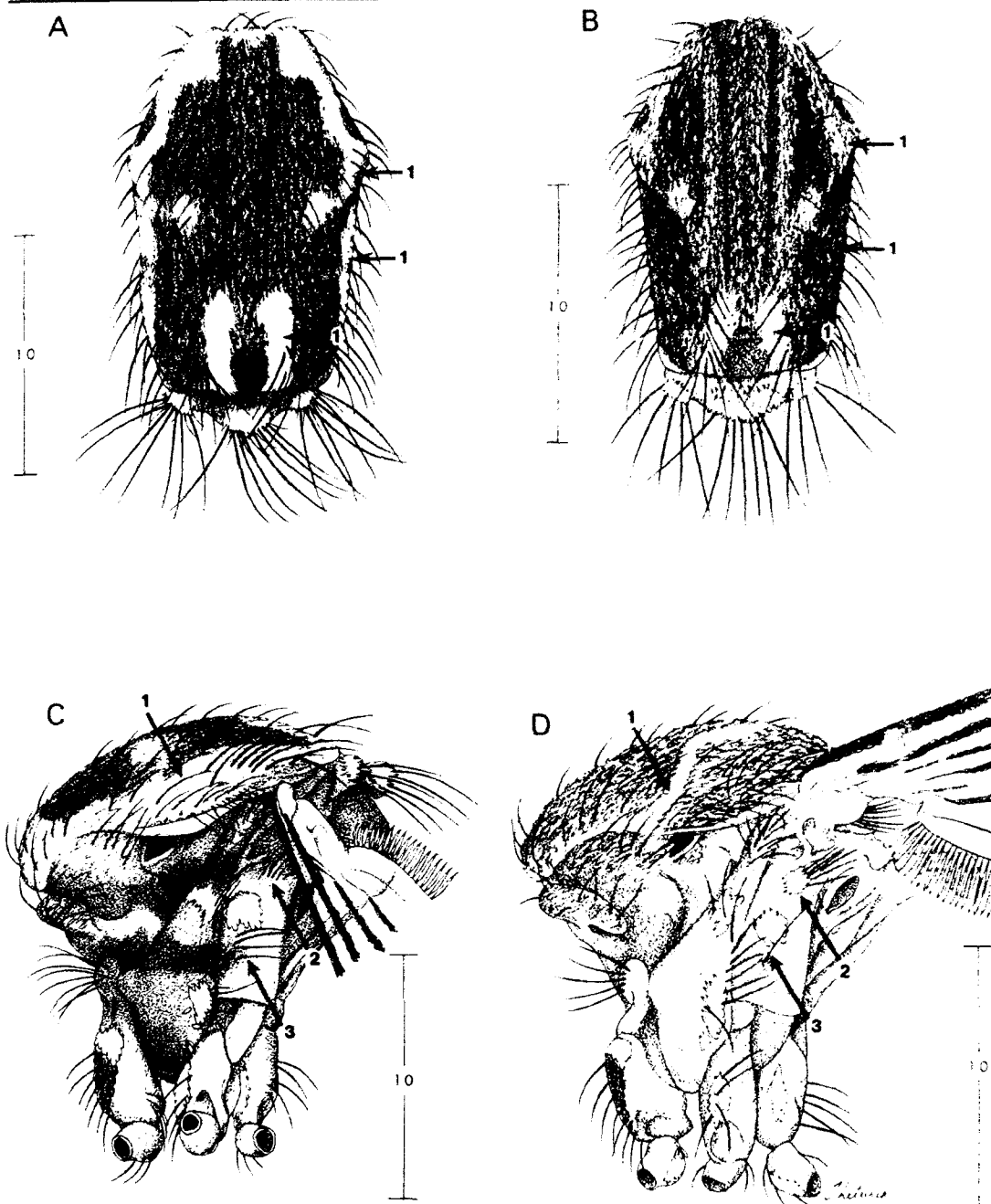


Fig. 1. A,B. Scutal scale patterns of (A) *Culex (Phenacomyia) corniger* and (B) *Culex (Culex) pseudostigmatosoma*. C,D. Thoracic pleura of (C) *Culex (Phenacomyia) lactator* and (D) *Culex (Culex) pseudostigmatosoma*. A,C. From Strickman and Pratt (1989); B,D. from Strickman (1990). Scales in mm.

ADULTS

- 4(3). Pleuron with distinct scale patches on mesokatepisternum 4a
 - Pleuron at most with a few scales along mesokatepisternal setae 5

- 4a. Scutum predominately bronzy-brown scaled with a pattern of white or creamy scales extending as a lateral band from anterior dorso-central line to anterior part of supraalar area, conspicuously broader anterolaterally, with a somewhat inconspicuous narrow extension

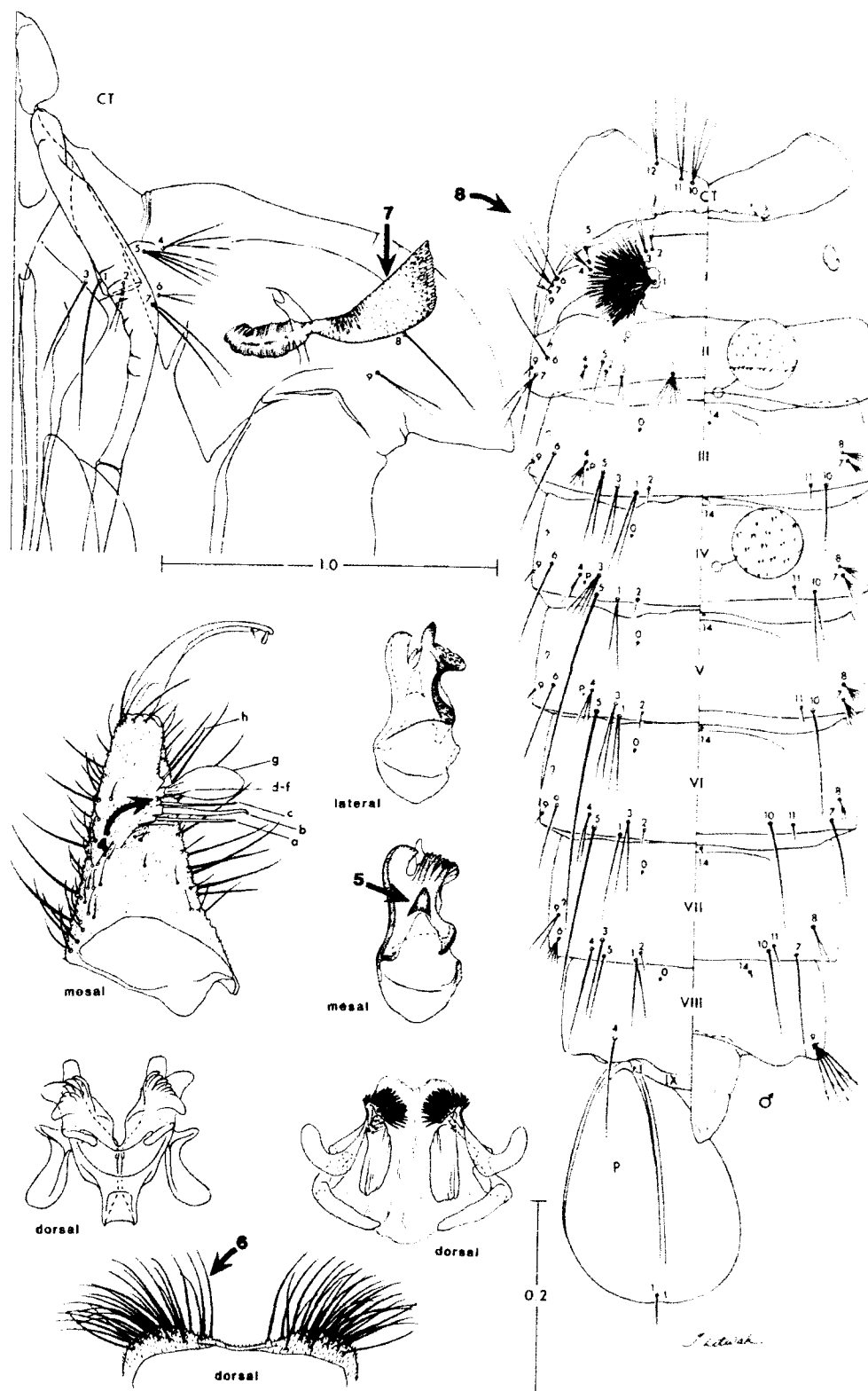


Fig. 2. Male genitalia and pupa of *Culex (Phenacomyia) corniger* (from Strickman and Pratt 1989). Scales in mm.

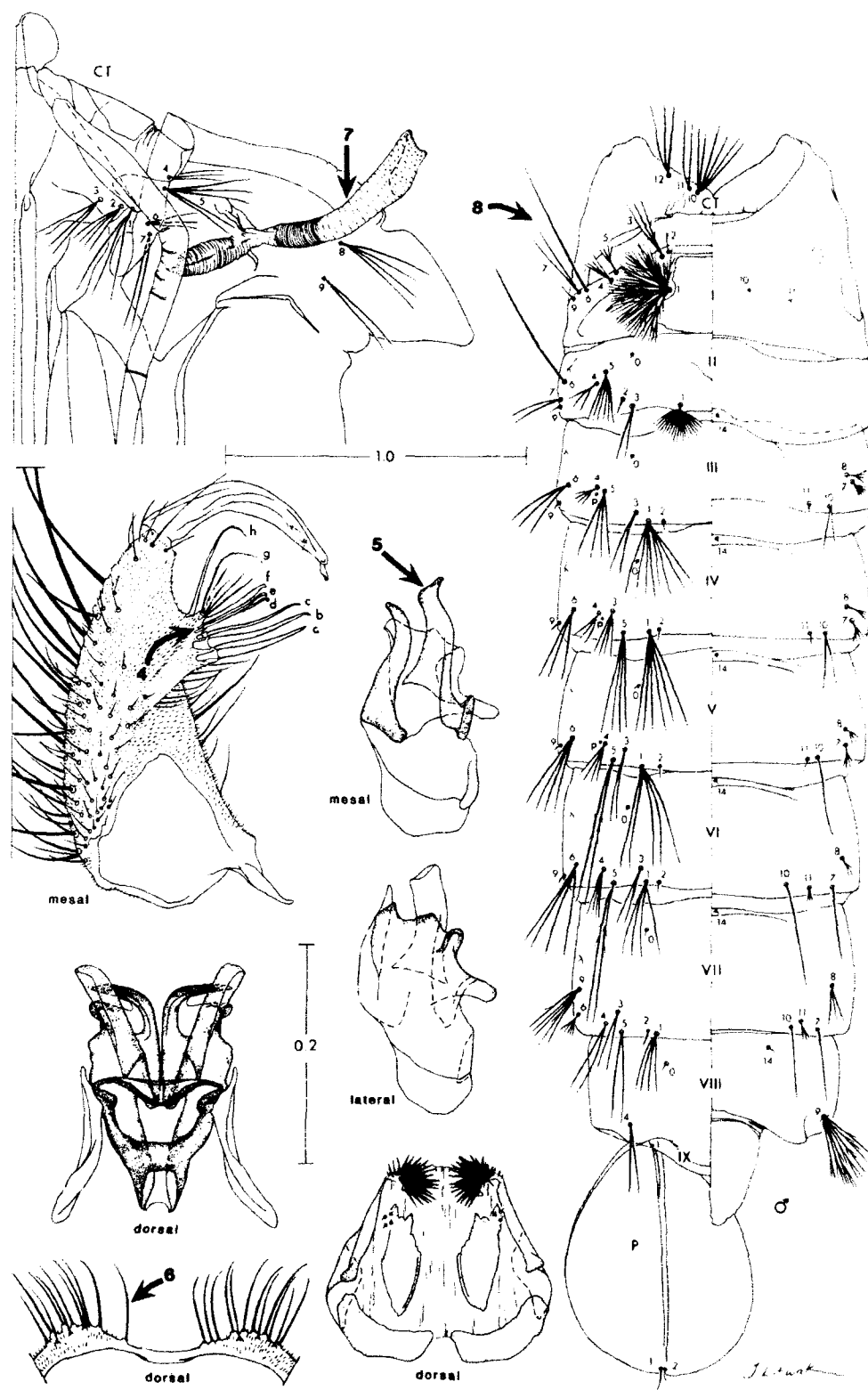


Fig. 3. Male genitalia and pupa of *Culex (Culex) pipiens* (from Harbach 1988). Scales in mm.

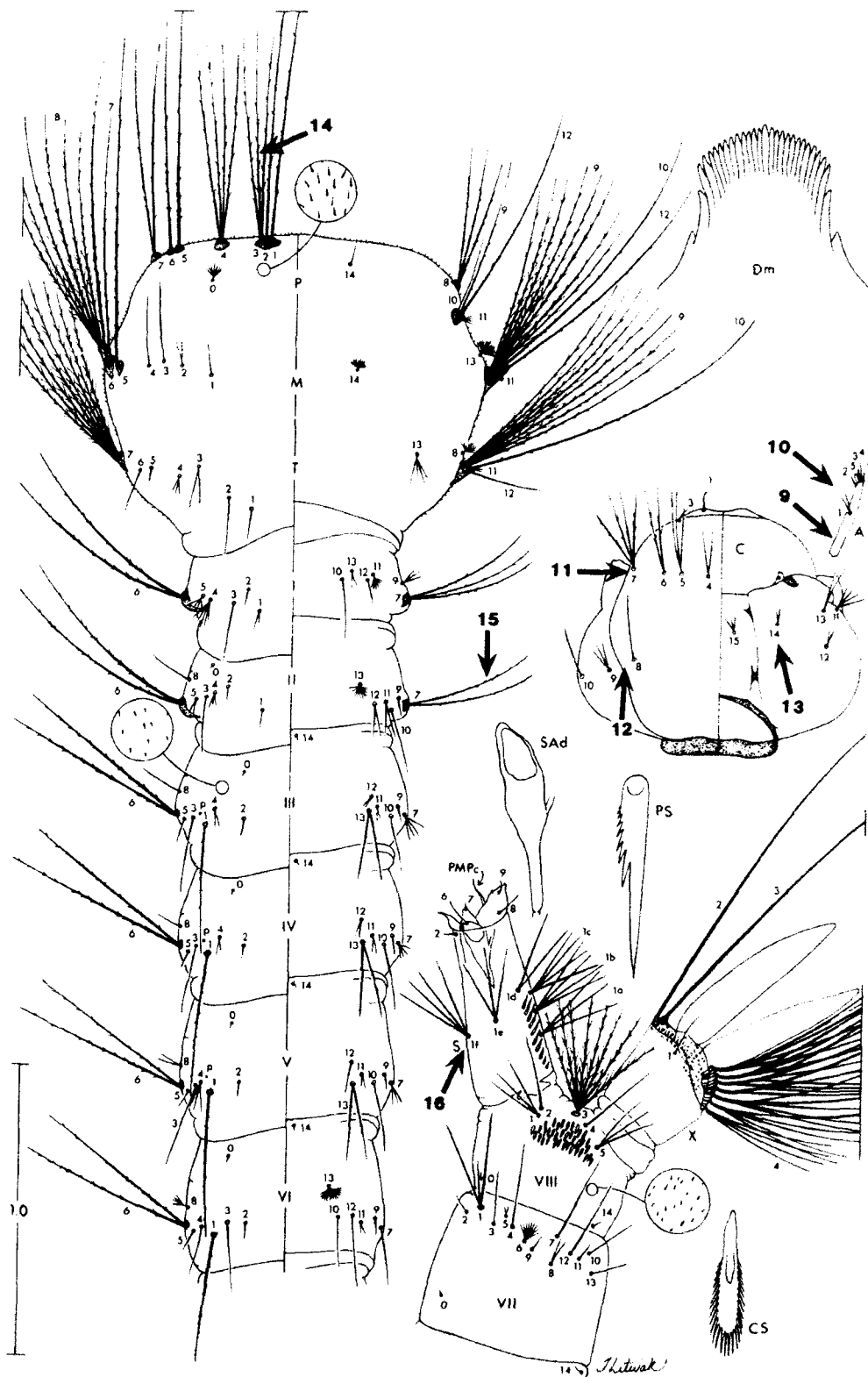


Fig. 4. Larva of *Culex (Phenacomyia) corniger* (from Strickman and Pratt 1989). Scale in mm.



Fig. 5. Larva of *Culex (Culex) pipiens* (from Harbach 1988). Scales in mm.

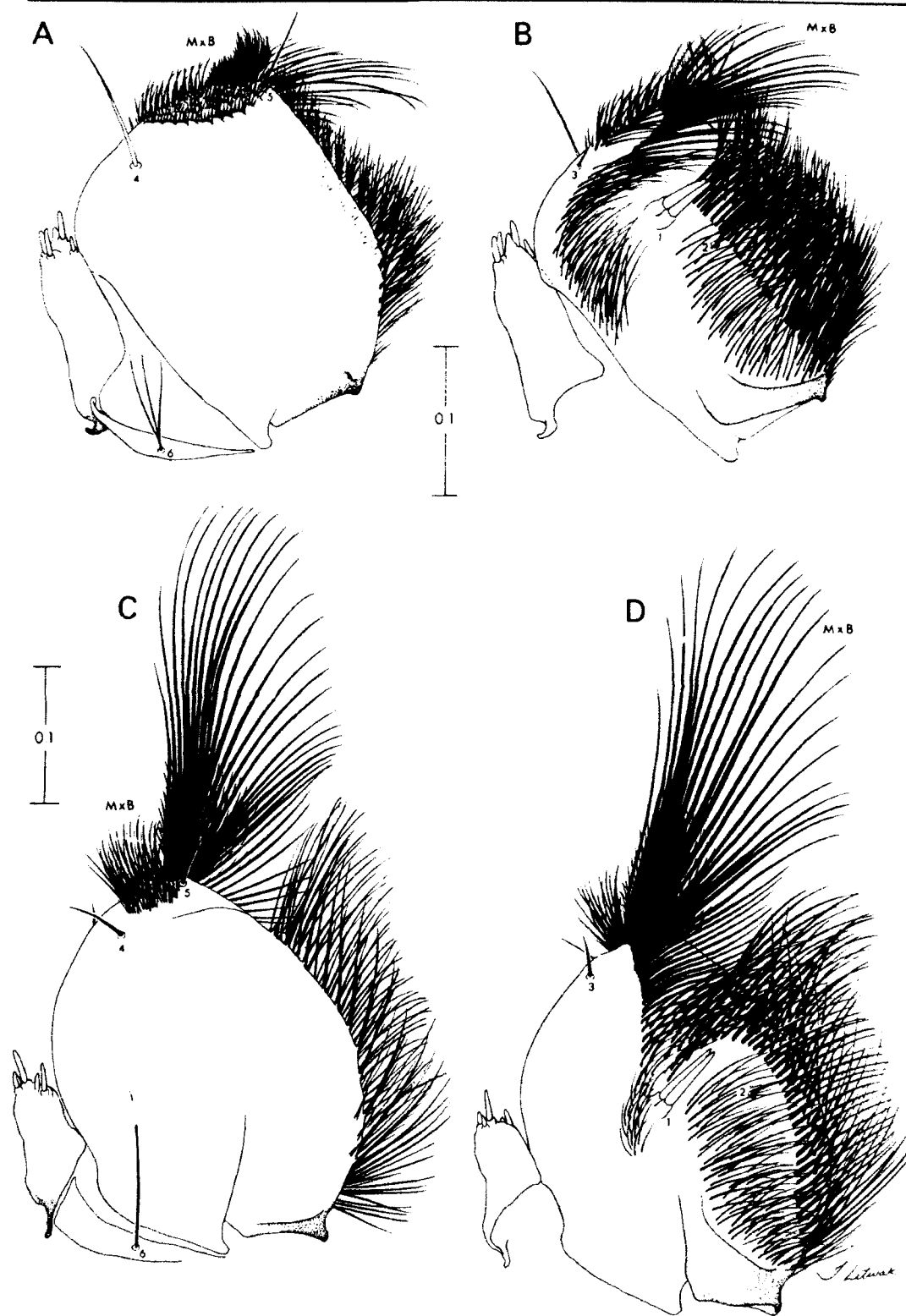


Fig. 6. Maxillae of (A,B) *Culex (Phenacomyia) corniger* (RDO 133, Dominican Republic, see Belkin and Heinemann 1973:208) and (C,D) *Culex (Culex) pipiens* (from neotype series of Harbach et al. 1985). A,C, Ventral aspects; B,D, dorsal aspects. Scales in mm.

dorsally at scutal angle, which often appears as a small spot at termination, and whitish lines on even side of precutellar space; without upper mesepimeral and postspiracular scales; hindtarsomeres with pale bands. *Phenacomya*

- Scutum with scales usually unicolorous or with inconspicuous pale areas, if with an apparent pattern of lighter scales, then pattern differs from the above in several respects or species possesses one or more of the following: upper mesepimeral scales (sometimes contiguous with lower mesepimeral scale patch), postspiracular scales, dark hindtarsomeres. *Culex*

MALE GENITALIA

1. Paraproct with dense clump of sharp spicules in addition to blunt teeth. 1a
- Paraproct with only a single row of blunt teeth. 2
- 1a. Dorsal arm of phallosome as long or longer than lateral plate; setae *d-l* of subapical lobe of gonocoxite represented by 1-4 setae, or absent, when only one seta (*l*) present, it is long and conspicuous; tergum IX lobe usually with 10 or fewer setae (2-17) in 1-3 rows. *Culex*
- Dorsal arm very short, much shorter than lateral plate; setae *d-l* represented by a single small, inconspicuous hairlike seta (*l*); tergum IX lobe usually with more than 17 setae (12-29) in 2-5 rows. *Phenacomya*

PUPAE

- 11(10). Metathoracic seta 10-CT usually with fewer than 4 branches. *Neoculex*
- Metathoracic seta 10-CT usually multiple, rarely with 3-4 branches. 11a
- 11a. Trumpet short and flared, pinna shorter than diameter at apex; seta 6-I,II about length of seta 7-I,II. *Phenacomya*
- Trumpet variable, pinna equal to or longer than diameter at apex; seta 6-I,II usually distinctly longer than 7-I,II. *Culex*

FOURTH-INSTAR LARVAE

1. Labrum produced in front; palatal brushes thickened, inserted in compact groups laterally. *Lutzia*
- Labrum not produced in front; palatal brushes normal. 1a
- 1a. Setae 4-7-C inserted in more or less straight transverse line. *Phenacomya*
- Setae 4-6-C usually inserted in triangular pattern, never in transverse line with seta 7-C. 2

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